Chemical & Engineering NEWS

More scientific news from ACS Kansas City meeting

9/27/82
A1250-1

Zeolite markets promise big new growth

Page 10

05111179C092 9 W AR6039SL 1
CONGRESSIONAL INFO SERV
4520 EAST WEST HWY SUITE 800
SRI ACQUISITIONS
BETHESDA MD 20814

BEST AVAILABLE COPY

September 27, 1982
Volume 60, Number 39
CENEAR 60 (39) 1–56
ISSN 0009-2347

Chemical & Engineering NEWS

Cover: One of many industrial uses for zeolites is as molecular sieves at natural gas processing plants. Photo courtesy of Davison Chemical division of W. R. Grace

2 Letters
3 Editors Page

Concentrates
8 Business
17 Government
21 Science/Technology

The Departments
33 Meeting Briefs
35 Books
42 Meetings
56 Newscripts

News of the Week

- ***National Academy of Sciences releases first of five volumes*** *of a study assessing the quality of Ph.D. programs that train scientists for research careers.* ***Page 4***
- ***Law suit by Monsanto against EPA*** *over release of herbicide's formulation finally settled satisfactorily.* ***Page 5***
- ***Allied Corp. may enter Bendix, Martin Marietta takeover fight;*** *if it occurs, merger would change Allied's focus from chemicals to aerospace and electronics.* ***Page 5***
- ***New fire-retardant mattresses*** *developed by Sealy over a four-year period now are on the market for hotels and motels.* ***Page 6***
- ***Du Pont reaches agreement*** *with Petro-Lewis Corp. to sell interests in 29 major oil and natural gas fields.* ***Page 6***

Business

- ***Demand for zeolites,*** *which had been tied to several specialty uses, is being spurred by detergent application.* ***Page 10***

International

- ***Canada's chemical industry*** *is troubled by a myriad of ills.* ***Page 16***

Government

- ***Economic goals are sound but are proving hard to achieve,*** *concludes an ACS symposium on Reaganomics.* ***Page 18***
- ***U.S. refusal to discuss militarization*** *of outer space angers developing countries at UN space conference.* ***Page 20***

Science

- ***From the ACS meeting:*** *structure of mutagen that is implicated in human colon cancer is determined; novel inorganic ring systems spark interest; tetrazine dimers studied spectroscopically; groundwater chemistry affects plutonium leaching; lanthanide-sensitized luminescence shows its usefulness in organic analysis.* ***Page 22***

Education

- ***Lab safety gets a boost*** *as U.S. schools begin efforts to identify and remove hazardous chemicals from classrooms and storage areas.* ***Page 27***

Technology

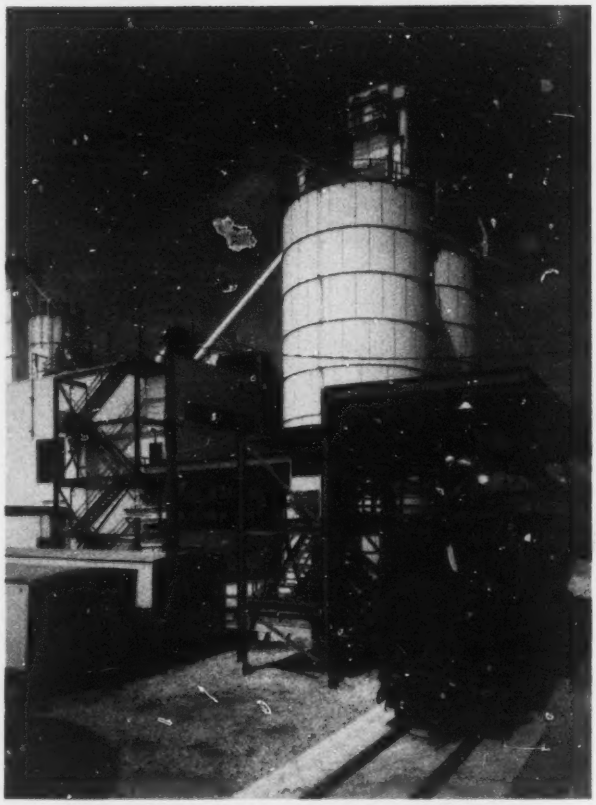
- ***From Kansas City meeting comes news*** *of remote sensing systems using optical fibers and lasers; oil recovery hampered by the windfall profits tax; and evaluations of C_1 chemistry processes.* ***Page 28***

ACS News

- ***Variety of activities*** *are revealed in photographs of Kansas City meeting.* ***Page 38***
- ***ACS offers employment aids*** *for unemployed members and proposes new activities to strengthen existing programs.* ***Page 40***

Detergents shift focus of zeolites market

Patricia L. Layman
C&EN, New York



PQ Corp.'s new Kansas City, Kan., zeolites plant

For zeolites, the business always has been specialties—specialty applications as adsorbents and desiccants, as key ingredients in cracking catalysts, as molecular sieves. Growth was steady, if not always spectacular, for a business that was nearly 60 million lb in 1975 and that had prospects for growth to 75 million lb in 1980.

Well, that part of it happened. But while the market for zeolites—naturally occurring or synthetic aluminosilicates—was going along its ordered way, a new use sprang up that has overwhelmed the business—detergent zeolites. From out of the blue, zeolites for use as detergent builders have gained a market of probably close to 300 million lb this year. New suppliers have entered the picture, and established producers of zeolites have watched the detergent business by and large pass them by. The actual—and potential—volumes are attractive enough, but that doesn't much soothe the hurt that the prices for the detergent zeolites are much less, sometimes only one tenth, those producers can obtain for specialty products.

But then, that's what has enabled the detergent market to grow—lower prices. From a start as molecular sieving agents, zeolites have always carried substantial price tags. Union Carbide, which developed the technology and held many of the early patents, had the field pretty much locked up. It had licensed only one other producer in the U.S., W. R. Grace's Davison Chemical unit, to produce the materials.

By the mid-1970s, however, the Carbide patents were expiring, and the major detergent makers were focusing on the aluminosilicate materials. Detergent makers were fighting the great phosphates fight: Phosphate builders, specifically sodium tripolyphosphate, were under attack by environmentalists who charged that the phosphates contributed to eutrophication of lakes and streams. Some states and regions banned phosphates as builders, and in other areas, detergent makers found it politic to at least lower the overall phosphate content in the formulation.

But what to replace the phosphates with? The first potential candidate—the trisodium salt of nitrilotriacetic acid—appeared to have health questions that needed answering. So the soapers turned to zeolites as sequestrants and ion exchangers that could help surfactants in a formulation overcome hard-water ions.

There was a specific need, however, for a price at least competitive with phosphates. And it wasn't until the patents on zeolites expired that that appeared possible. Naturally occurring, mined zeolites, of course, are available for as little as 10 cents per lb, but those materials don't offer the same attributes—purity of color, predictable performance, and so on—that a large-volume consumer application demands. Henkel in Europe and Procter & Gamble began working with potential suppliers of zeolites, and the way it has settled out, Ethyl Corp. is now by far the largest supplier of zeolites in the U.S. Ethyl's plant came on stream at Pasadena, Tex., in the late 1970s. And PQ Corp. is getting into the business, with the zeolite plant it just brought on stream this month at Kansas City, Kan. Meanwhile, such early suppliers of zeolites as Union Carbide, Davison, and J. M. Huber have seen the detergent market basically pass them by, and they are working to get back into contention.

For PQ and Ethyl, the business has been one of building on corporate strengths. For example, explains PQ zeolite venture manager Howard Sherry, Zeolite A, the most commonly used detergent zeolite, is two thirds sodium silicate, and PQ is the largest maker of that silicate. PQ, which has long marketed silicates to the detergent and soap industry, has witnessed its customers lately back-integrating into the material. "That meant we had to think about forward integrating, just for protection," says Sherry. "We had to look into making the products that use sodium silicate."

PQ also had to look into a material that was causing a serious dip in silicate use in detergents: from a high level of 7 to 10% in a detergent blend, to only 2 to 5% in formulations also containing zeolites. And there probably was some drive to upgrade its product line, with value-added technology for its sodium silicate.

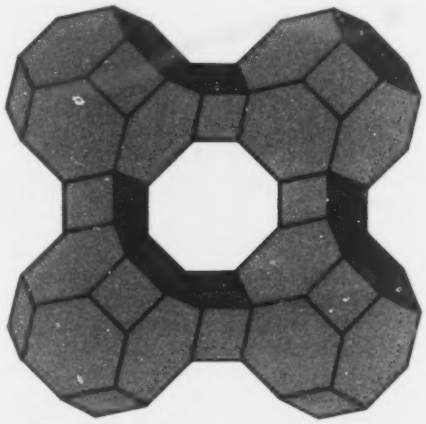
Similarly, Ethyl was working off its strengths on the aluminum side. The company had done some R&D work on zeolites when the business began

opening, using its know-how in metal chemistry derived from aluminum alkyls and antiknock compounds. "When the detergent industry became interested, it was very logical for us to seek to become a supplier," points out Fred R. Hogeman, marketing manager for alcohols and builders at Ethyl.

With a price of 28 to 30 cents per lb, zeolites are competitive with phosphates, which can run more than 35 cents per lb. That's true, marketers say, even given slightly poorer performance; for their cost, phosphates can't be beat as general, all-around sequestrants, especially for both calcium and magnesium ions, the commonest hard-water ions. Zeolites neatly remove calcium, but are less effective on magnesium—thereby requiring a cobuilder. That cobuilder can be phosphates, or even NTA, as it is being revived as a builder. In fact, some marketers believe that the revival of NTA will help the zeolites business. Zeolites are ideal low-cost ingredients to blend with and buffer the high cost of NTA, they say.

P&G has begun using zeolites in products for some of the regions it sells into, especially those in which phosphates are banned. And other, smaller detergent makers are turning to the materials, too. One problem potentially limiting widespread use is the patent question. P&G filed use-patent applications for detergents some seven years ago. However, those applications still are pending. If the patents are issued, "it would preclude any major use of zeolites by anybody else," says one detergent supplier. But the assumption seems to be that if the patent hasn't been issued in all this time, it never will—and the market will be wide open.

That, in turn, could boost con-



Controlled pore size is key to zeolite performance

Zeolites are crystalline aluminosilicates. The key to their activity is that the anhydrous crystal has a large, regular pore structure that lends itself to adsorption or catalysis.

Moreover, because of their chemical structure, zeolites function efficiently as molecular sieves to sort out molecules, and as ion-exchangers. The crystalline structure has a negative charge from the AlO_2 framework in the crystal. That requires a cation of some sort to neutralize the compound. And it's the cation that controls selectivity.

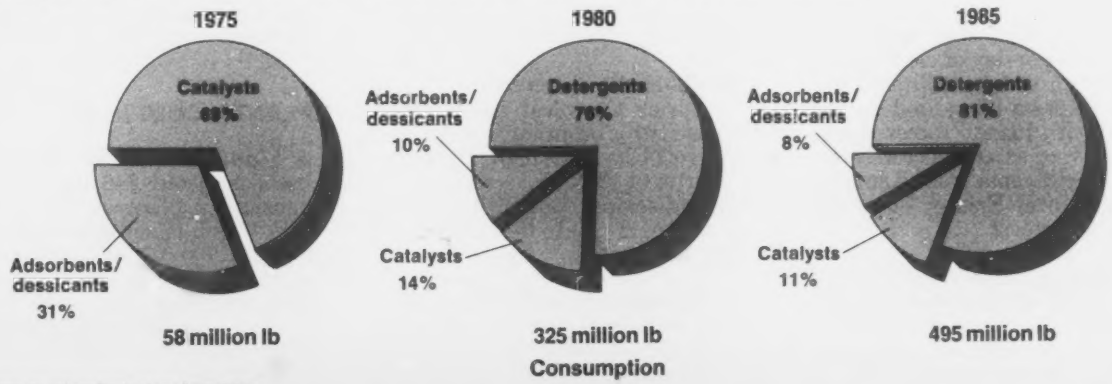
For example, the parent compound of the Type A zeolite, the most widely used, is the sodium compound, $Na_{12}[(AlO_2)_{12}(SiO_2)_{12}]xH_2O$, otherwise known as Type 4A. The sodium cations in the crystals partially block the pore openings, limiting the opening to about 4 Å.

The type 3A zeolite replaces the sodium cations with potassium. The potassium ion is larger, so blocks more of the pore, and the effective opening is roughly 3 Å. Correspondingly, for Type 5A zeolites, calcium ions replace the sodium. The ionic radii of the calcium +2 and sodium +1 ions are roughly the same, but because only half the number of calcium ions are required to balance the compound, more of the pore openings are unblocked. The effective opening is nearly 5 Å.

Other alumino-silicate-cation ratios can tailor the crystalline pore openings even further, making it possible to fine tune separations.

Synthetic zeolites basically have been an attempt to replicate and improve upon natural zeolites, found in large deposits in the western U.S. Much of the improvement comes in reproducibility, eliminating much of the chance aspect found in naturally occurring product. Because the materials are such excellent ion-exchange agents, they tend to take up whatever cations are in the local groundwater—magnesium, calcium, iron, barium, or more exotic ions such as strontium.

Detergents have come from nowhere to dominate U.S. zeolites market



Source: Oxenham Technology Associates

BEST AVAILABLE COPY

sumption even more than present levels in detergents—a level now approaching nearly 80% of the entire zeolites business. "When detergents get involved, they require such large volumes that that application quite frequently eclipses the volume for other applications," notes one producer.

Once beyond the sphere of laundry detergents, however, zeolites are solidly a specialty business. Uses are relatively low volume and high priced (anywhere from five to 10 times those of detergent-grade zeolites). And significant amounts of technical service and development are demanded of suppliers. It also is, ironically, the older business, going back to the 1940s and Union Carbide and its Linde unit, that developed molecular sieves—a name Linde coined—for air separation. The zeolites adsorb nitrogen, enabling production of an oxygen-rich stream from compressed air.

This adsorption application also has been joined by desiccant applications, especially for natural gas transportation, taking out water or contaminants such as carbon dioxide and sulfur compounds. That's especially important, marketers say, for cryogenic gas separation, when the gas is chilled to remove compounds heavier than ethane. Contaminant moisture would freeze and wind up on the heat exchangers, fouling the procedure.

Marketers say the outlook continues to be promising for such applications. Already important as materials to purify the feedstock in conventional polypropylene and polyethylene processes, zeolites are used in low-pressure linear polyethylene processing in which they purify the feedstock gas coming in so contaminants won't poison the catalysts used in the processes.

And zeolites, functioning as molecular sieves, get another boost from the detergent field in addition to that of builders. They separate iso- from normal-paraffins, for linear paraffin feedstocks for surfactants.

Other uses have settled in, too. The increasing popularity, for example, of twin-pane insulating window glass has meant an increasing demand for zeolite desiccants to keep the air space between the panes free from moisture vapor building up from the sealants used to form the panels.

Not all of the applications that bright thinkers come up with work out, of course. One technical development specialist relishes recounting one attempted use, for example, as a drying aid in hair curlers. "That was back in the days before blow-dryers," he says. "The inventor wanted to put desiccants into the curler, to dry the hair faster." The product "flopped," he adds.

Other applications in this segment of the market offer more promise: as the basis for a kind of solar heat storage battery; for reversible adsorption and desorption; as carriers for chemical reactions, releasing a chemical, for example, when water hits the compound and carrier; and as a method of concentrating hydrogen for potential fuel use.

One potential application, as an animal feed additive, even has the promise of reaching commodity proportions. Researchers who originally had tried adding zeolites to chicken feed in an in-situ attempt to remove ammonia from manure to hold down odor, found that, instead, the plus was an improved efficiency in feed utilization, allowing a faster weight gain.

Many of the suggested uses, however, still are what one marketer calls "weird little things." That, in part, has kept adsorption-desiccation the smallest segment of the zeolites business—an estimated 10% of total

CHECKOFF

NEW PLANTS

■ **Fluorocarbons**—Halocarbon Products Corp. has begun construction of plant in Aiken County, South Carolina, to make both trifluoroacetic acid and trifluoroethanol; completion is scheduled for second-half 1983. Cost and capacities were not disclosed.

■ **Industrial gases**—Airco Industrial Gases will build plant in Franklin, Ky., with capacity of 180 tons per day of carbon dioxide at cost of $4 million. Completion is set for second-quarter 1983 with Plant Process Equipment Inc. as contractor. Feedstock will come from Kentucky Agricultural Energy Corp. fuel alcohol project.

At Sacramento, Calif., Airco will build $12 million plant to produce 260 tons per day of atmospheric gases separated from air; on-stream date is mid-1983.

At Deer Park, Tex., Liquid Air will build gaseous hydrogen unit at cost of more than $1 million to compress and purify hydrogen from by-product stream from Diamond Shamrock's nearby chlor-alkali plant.

■ **Isocyanates**—Rubicon Chemical subsidiary of ICI Americas will expand polymeric diphenylmethanediisocyanate (MDI) capacity at Geismer, La., 30%, bringing total to about 130 million lb by mid-1983. Engineering has been completed on previously announced 150 million-lb-per-year plant.

■ **Specialty resins**—B. F. Goodrich Chemical will double capacity for proprietary resins at Calvert City, Ky., plant by third quarter of 1983. No capacity has been disclosed for resins used as thickeners and flow control agents.

■ **Styrene**—Amoco Chemicals will modernize and expand unit 28% at Texas City, Tex., to make this aromatic monomer, bringing capacity to about 770 million lb per year. Lummus is contractor for engineering and procurement and Brown & Root is contractor for construction. Completion is set for August 1983.

■ **Titanium dioxide**—Du Pont will spend $2 million to expand capacity for rutile paper slurry grade material at Edge Moor, Del., plant 79% from an undisclosed amount. Expansion, to be completed in mid-1983, is to keep up with demand for RPS grade as paper makers continue to switch from anatase form of titanium dioxide.

PLANTS COMPLETED

■ **Alumina**—Martin Marietta has completed $46 million expansion of plant on St. Croix, U.S. Virgin Islands, bringing capacity to 700,000 tons per year for aluminum metal raw material. Company also seeks partners for further investment of $500 million to bring capacity to 1.5 million tons per year.

consumption in 1980, shrinking slightly to 8% by 1985, as detergents continue to grow and overwhelm the U.S. zeolites market. New uses are contributing to a growing market, however, as that segment of the U.S. market more than doubles from 1975 to 1985.

Doubling is more than can be said for the area of catalysts, primarily fluid-cracking catalysts. According to studies of the North American and European zeolites markets by Houston-based consultants Oxenham Technology Associates, U.S. demand for synthetic zeolites in catalysts is expected to reach 55 million lb in 1985, up from 40 million lb in 1975. Other estimates are somewhat higher, pegging present consumption at 60 million lb per year, but that may cover total world consumption. Growth through the early 1970s was more rapid; one estimate of consumption in the U.S. in 1974 was 21 million to 30 million lb.

Most of the catalyst market is in North America. By one recent count, Western Europe accounted for 47 catalytic cracking units, Latin America for 38, and the Middle East, 7—compared with the more than 150 in the U.S. and Canada.

To some extent, to talk about the market for zeolites in catalysts is misleading; the use of catalysts is far more significant than the estimates for zeolites would indicate. Unlike other zeolite applications, catalysts are a compounded product. Zeolites—the crystalline aluminosilicates—are embedded or formed in a matrix carrier clay in concentrations ranging anywhere from 5 to 40%. The matrix itself also is to some degree catalytically active.

There are two basic methods of preparation: gel-based zeolites, and clay-based zeolites. The gel process starts with sodium silicate and alumina, reacted to a gel matrix to which is added zeolite. The clay process starts with an aluminum-containing clay such as kaolin, which is treated to obtain both alumina and silicated clay, in a matrix to which zeolite is added. Typical starting zeolite is one known as Zeolite Y—approximate formula $Na_{58}[(Al_2O_3)_{58}(SiO_2)_{134}\text{-}(H_2O)_{250}]$. The zeolite then generally is heavily substituted, with various rare earth oxides—for example, lanthanum, neodymium, and cerium mixtures—replacing the Na_2O.

The degree of substitution, what's used to substitute, and how the substitution is effected are highly individual arts, and help explain why the field of catalysis is such a traditionally closed-mouthed area for the three major producers, Engelhard, Davison, and Filtrol.

Some people see that changing, however, particularly as the chemistry of zeolites becomes better understood. "These are regular structures, so chemists can more easily unravel what's really going on," says one researcher.

There also is more pressure being put on the industry to improve efficiency in performance. The petroleum industry had been putting a lot of time and effort on zeolite catalysts through the 1960s and into the early 1970s. But the oil embargo by the Organization of Petroleum-Exporting Countries' states added impetus to the work. The zeolite-containing catalysts dramatically increase cracking efficiency; normally reserved chemical engineers talk about "previously unheard of" improvements, or improvements on the order of "a millionfold."

In the wake of an economic slowdown, the demand for zeolites continues high. With demand for gasoline leveling off or down slightly, refineries generally are running at 60 to 65% of capacity. But catalytic crackers are running at 80 to 85% capacity.

■ **Antioxidants** — Ciba - Geigy has expanded capacity 50% from an unspecified capacity at McIntosh, Ala., to make proprietary family of hindered phenolic antioxidants. New capacity is expected to meet demands through 1985 for uses in plastics, coatings, fibers, and films.

■ **Butyl acrylate**—Badische has started up new unit in complex at Freeport, Tex., to make this widely used ester. Complex with expanded 2-ethylhexyl acrylate unit, acrylic acid unit due on stream in fourth quarter, and butyl acrylate unit will have total capacity of 350 million lb and cost $210 million.

■ **Calcium carbonate**—Pfizer minerals, pigments, and metals division has started up first phase of expansion at Adams, Mass., plant making coated grades of ultrafine precipitated calcium carbonates used as plastics and rubber additives. Uncoated products are scheduled to be made beginning in 1983.

■ **Carbon dioxide**—Liquid Carbonic subsidiary of Houston Natural Gas began operations in 400-ton-per-day unit to recover this gas, once vented from adjacent Agrico Chemical ammonia plant.

■ **Catalysts**—Engelhard's minerals and chemicals division has completed its third expansion since 1973 of its Attapulgus, Ga., plant making fluid catalytic cracking materials tailored to special needs of refiners.

■ **Enzymes**—Novo Biochemical Industries has completed $15 million expansion of Franklinton, N.C., plant, tripling its undisclosed original capacity for these materials, used in corn sweeteners, ethanol, detergents, and other products.

■ **Polyethylene**—Gulf Oil Chemicals has completed $35 million expansion of Orange, Tex., facilities, bringing capacity to make high-density polyethylene to 575 million lb per year from 420 million lb. Expansion brings company's polyolefins capacity to 1.9 billion lb, or about 9% of U.S. total capacity.

■ **Specialty chemicals**—Ritchem Co., Pleasantville, N.Y., has begun manufacture of Michler's ethyl ketone, derivative of tetramethyldiaminobenzophenone and Michler's methyl ketone, used in making certain dyes and in photographic and other industries.

■ **Sulfuric acid**—Texasgulf Inc. has started up 3100 ton-per-day unit at Lee Creek, N.C., to make this acid, used in making phosphoric acid for fertilizers. Monsanto Enviro-Chem Systems designed unit.

PLANT CLOSING

■ **Ammonia fertilizers**—Vistron subsidiary of Standard Oil (Ohio), has closed indefinitely its units at Lima, Ohio, making ammonia, urea, and carbon dioxide because of high gas cost and soft market for ammonia.

Phillips has your Sulfur Chemical ...Worldwide.

Mercaptans
- n-Propyl mercaptan
- iso-Propyl mercaptan
- n-Butyl mercaptan
- sec-Butyl mercaptan
- iso-Butyl mercaptan
- tert-Butyl mercaptan
- n-Hexyl mercaptan
- Cyclohexyl mercaptan
- n-Octyl mercaptan
- tert-Octyl mercaptan
- tert-Nonyl mercaptan
- n-Dodecyl mercaptan
- tert-Dodecyl mercaptan
- tert-Tetradecyl mercaptan
- tert-Hexadecyl mercaptan
- tert-Mixed mercaptans
  - (C_9, C_{12})
  - (C_{12}, C_{14}, C_{16})
- 2-Mercaptoethanol
- Benzyl mercaptan

Sulfides
- Ethylthioethanol
- Di-n-butyl sulfide
- Di-tert-butyl sulfide
- Ethylthioacetate
- Phenylthioethanol

Disulfides
- Di-tert-butyl disulfide
- Di-tert-dodecyl disulfide
- Di-n-butyl disulfide

Polysulfides
- Di-tert-butyl polysulfide

Sulfones
- Sulfolane (anhydrous)
- Sulfolane-W
- Sulfolene

New Developmental Sulfur Chemicals From Phillips:

We can now produce developmental to commercial quantities of Di-n-propyl and Di-sec-butyl disulfides, Ethanedithiol, Thiodiglycol and Di-tert-nonylpolysulfide.

PHILLIPS 66

PHILLIPS CHEMICAL COMPANY
A SUBSIDIARY OF PHILLIPS PETROLEUM COMPANY

Business

"If it's the most efficient way to do it, it makes sense to keep them running," says one marketer. Moreover, what the cracking units are processing is boosting the demand for zeolite catalysts, as well. "We were cracking fairly easy-to-crack feedstocks," says one producer, "but the crude slate has been changing to much more difficult-to-crack feeds" with a lot of metal and residue contamination. And increasing amounts of residual oil—normally burned as Bunker C fuel—are being diverted to catalytic crackers. That basically means refiners are adding more zeolite to cope with increased contamination, inactivity caused by elevated processing temperatures, and so on. Where once a barrel of oil would require roughly 0.15 lb of catalyst for processing, "today, it's not uncommon to go as high as 1 lb per barrel, in some specially designed units," says one marketer. And if the catalyst has an average of 15% zeolite, it's not a market to sneeze at.

From catalytic cracking to treating the petrochemical feedstock stream, zeolites benefit. In fact, as Paul Shimizu, general manager for silica products and adsorbents at Grace's Davison Chemical division puts it, "As long as the need for petrochemical feedstocks remains strong, the need for zeolites to treat them will remain strong."

And even the prospect of coal gasification sending in feedstocks to replace petrochemicals doesn't faze zeolite marketers. They're cheering for the success of the Texaco coal gasification process that Eastman Chemical is using in a plant it is building now at Kingsport, Tenn., and of such technology as the Purdue University method for converting ethanol and water mixtures into gasoline, which uses zeolite catalysts (C&EN, Aug. 9, page 6). "If coal gasification hits, that would be tremendous for us, in treating the process gases such as hydrogen," says Grace's Shimizu. "We can get the markets either way."

The entire field of zeolites is nothing to sneeze at. Companies already in the business and those getting in are betting that this steady little specialties market is just starting to take off, spurred by the detergents industry. That demand has brought about low-cost zeolites, which may help encourage the development of new applications. From there, it will be a challenge for producers to develop specialty forms and grades of zeolites to keep prices and profit margins as healthy as the market outlook is. □

C&EN INDEX Annual 1981

All the information that appeared in C&EN last year is at your fingertips

Whether you are interested in wide coverage of a general topic or just a brief letter to the editor — if C&EN published it last year, you will find it listed in this comprehensive index.

You'll find information on many broad fields — drugs, energy, health, nuclear power, etc. — many with 50 or more listings!

Legislation, research, economics, processing . . . whatever aspect of the subject you want to know about . . . you will find it quickly and easily.

Just published, this comprehensive, useful index is available paperbound, in microfiche or microfilm.

Save time and effort . . . **CALL TOLL FREE: 800-424-6747** or use the coupon below to order your C&EN INDEX Annual 1981 edition now!

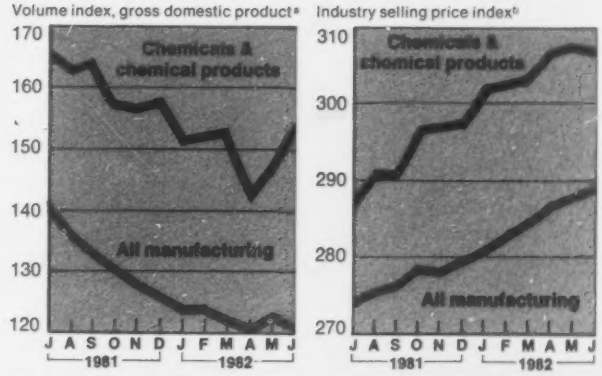
Distribution Office **1982**
American Chemical Society
1155 Sixteenth Street, N.W.
Washington, D.C. 20036

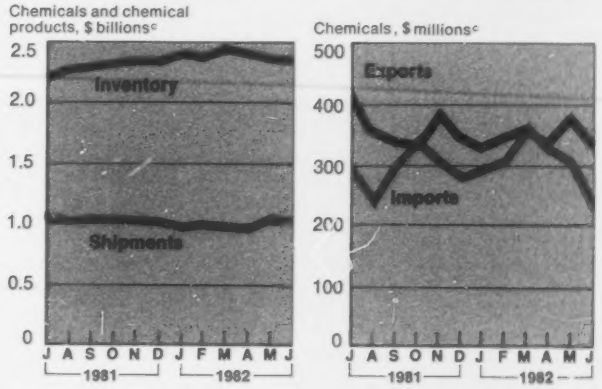
YES, please rush me _____ copies of the new **C&EN INDEX Annual 1981** at the price indicated below:

☐ Paperbound $35.00 ☐ Microfiche $35.00
☐ Microfilm (ACS Member) $35.00 ☐ Microfilm (Nonmember) $45.00
☐ Payment enclosed (payable to American Chemical Society)
☐ Master Charge ☐ VISA ☐ Bill company

Account No. _____
Interbank No. _____ (Mastercharge Only)
Expiration Date _____
Signature _____
Name _____
Organization _____ Title _____
Address ☐ Home ☐ Business _____
City, State, Zip _____

Canadian chemicals still in trouble





a Seasonally adjusted; 1971 = 100. b 1971 = 100. c Canadian dollars.
Source: Statistics Canada

Chemical output: a dismal performance

Production, thousands of metric tons	1981	First-half 1982	First-half 1981	% change
ORGANICS				
Ethylene	1330	457	662	−31.0%
Propylene	677	287	328	−12.5
Benzene	566	247	311	−20.6
Toluene	480	208	219	−5.0
Xylene	410	190	209	−9.1
PLASTICS				
Polyethylene, low density	451	201	209	−3.8
Polyethylene, high density	223	93	113	−17.7
INORGANICS				
Hydrochloric acid	186	67	92	−27.2
Nitric acid	861	385	430	−10.5
Phosphoric acid, 100% P_2O_5	744	314	406	−22.7
Sulfuric acid	4117	1839	2113	−13.0
Ammonia, anhydrous	2654	1267	1325	−4.4
Ammonium phosphate	1355	549	726	−24.4
Chlorine	1292	616	656	−6.1
Sodium hydroxide	1458	685	733	−6.5

Source: Statistics Canada

The Canadian chemical industry's dream of becoming a major factor in the world petrochemical market may come true in time. But it will be delayed. For the moment, the industry, along with most other Canadian industries, is in big trouble.

The Canadian economy is in a shambles. Gross domestic product has been falling since the second quarter of last year. Unemployment has remained persistently high. Housing starts are down. Other industries that are important outlets for chemicals—pulp and paper, for instance—are retrenching.

Although there are signs that these problems may be starting to ease, inflation has been running at an average annual 10.5 to 11%. The Canadian dollar remains weak relative to the U.S. dollar.

All of this has had an obviously adverse impact on the Canadian chemical industry. And, to make matters worse, the worldwide petrochemical glut is making it increasingly difficult for the industry to export. Canadian chemical exports declined in the second half of last year compared to the first half, and declined again in the first half of this year.

With the market so shabby, however, chemical imports also have dropped off. As a result, the chemical industry has been able to maintain its favorable balance of trade surplus in chemicals.

The prolonged Canadian and world recession has cut into sales of most Canadian chemical companies. And, along with lower sales volume has come a bath of red ink as far as profits are concerned.

As a result, Canadian chemical companies are doing all they can to pare expenses and to conserve cash flow. The most startling example of cash-conservation efforts has been Union Carbide Canada's recent decision to bow out of the $300 million (Canadian) ethylene glycol plant it was building in Prentiss, Alta. The U.S. parent company, Union Carbide Corp., will take over financial responsibility of the project from its Canadian subsidiary, which suffered a net loss of $5.7 million during the first half of the year.

Many Canadian chemical companies, Union Carbide Canada included, put much of the blame for their predicament squarely on the government. Weak market demand had made it impossible for them to increase prices to profitable levels. Yet, government energy policies have sent feedstock costs soaring. This is especially true of oil-based feedstocks.

Whatever the reasons, the results are obvious. Six-month production statistics paint a discouraging picture. Everything is down, down, down—basic organics, plastics, and inorganics alike.

Earlier this month, Prime Minister Pierre Elliott Trudeau played musical chairs with four of his cabinet ministers. The energy minister became the finance minister, the finance minister became the minister of external affairs, and so on. These moves are considered a sign of just how serious the government thinks the economic situation is. But Canadian chemical executives would rather see the government do more about it than just play musical chairs.

Earl Anderson, New York

BEST AVAILABLE COPY